JOB SHEET 2-3-41
VR/SHEAR DISPLAY FUNCTION

INTRODUCTION

The VR/Shear Display function provides the operator with a quick method of estimating rotational velocity and shear for any selected velocity couplet. This function only works on the Graphic Tablet with a **16 data-level** Base Velocity (V) product or one of the Storm Relative Velocity products (SRM, SRR) or an *active* high resolution Time Lapse of these products. Besides the rotational velocity and shear, the range and diameter of the selected velocity couplet are also displayed. All parameters are written to the feedback area on the bottom right-hand corner of the screen.

OBJECTIVE

Use the Graphic Tablet to calculate and display the rotational velocity and shear of a velocity couplet.

REFERENCES

NWS EHB 6-531-1, USERS GUIDE: PUP\RPGOP, Section 6.15.

PROCEDURE

Graphic Tablet

1.   Select a 16 data-level Base Velocity, Storm Relative Velocity map or Storm Relative Velocity region product on either the right or left screen. The selected product can be either a full or quarter screen display.

   -    It is helpful to magnify the product before selecting the two points. This ensures the accurate selection of the strongest velocity values. Remember that the SRR product can not be magnified.

2.   Define the velocity couplet by selecting two points across an area of interest.

   -    Note that once the points are selected they are retained until another cursor position is selected or the PRESET CENTER function is selected.

GRAPHIC TABLET

KEYBOARD | SYMBOLS | USER FUNCTIONS

EDIT COMMANDS / KEYBOARD / SYMBOLS / USER FUNCTIONS

EDIT ANNOT	EDIT ALERT AREA	DELETE ALERT BOX	ADD ALERT BOX	DEL RCTL	ADD RCTL		EDIT RCM PART A		EDIT RCM PART C		57 25	58 26	59 27	60 28	61 29	62 30	63 31	64 32	26	27	28	29	30
EDIT MAP	HIGH DETAIL	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	+ =	BACK SPACE	51 19	52 20	53 21	54 22	55 23	56 24	21	22	23	24	25
START ERASE	END ERASE	Q	W	E	R	T	Y	U	I	O	P	– -	RET	45 13	46 14	47 15	48 16	49 17	50 18	16	17	18	19	20
START LINE	END LINE	A	S	D	F	G	H	J	K	L	: ;	" '	UPPER SHIFT	39 7	40 8	41 9	42 10	43 11	44 12	11	12	13	14	15
CANCEL EDIT	EXIT EDIT & SAVE	Z	X	C	V	B	N	M	< ,	> .	? /	SPACE	LOWER SHIFT	33 1	34 2	35 3	36 4	37 5	38 6	6	7	8	9	10

PARAMETERS (left column)

- AZRAN SELECT
- CROSS SECTION SELECT
- RPG
- TIME
- DATE
- REPEAT COUNT
- END HOUR
- SLICE/ DURATION
- CENTER AZIMUTH
- CENTER RANGE
- STORM DIRECTION
- STORM SPEED
- CONTOUR INTERVAL
- ALL/ONE SWA
- MATCH PARA-METERS
- DEFAULT PARA-METERS

DISPLAY FUNCTIONS (right grid)

UF1	2	3	4	5
CANCEL UF	SPEED DOWN	SPEED UP	FRAME BACK	FRAME FORWARD
TIME LAPSE RES/HLT	TIME LAPSE 1	TIME LAPSE 2	TIME LAPSE 3	CONTINUOUS LOOP
AUTO RES/HLT	QUAD 1	QUAD 2	RECENTER MAG 1X	RECENTER MAG 2X
FULL SCREEN	QUAD 3	QUAD 4	RECENTER MAG 4X	RECENTER MAG 8X
CLEAR SCREEN/ QUAD	FILTER	COMBINE DOWN	COMBINE UP	CURSOR HOME DEFINE
BLINK COLOR LEVEL	RESTORE DISPLAYED PRODUCT	GRAY/COLOR SCALE	CURSOR AUTO/ MANUAL	CURSOR LINK/UNLINK
ALL QUADRANTS	HARD COPY	PRESET CENTER	CURSOR HOME	AZRAN R/ LAT LON/ AZRAN H

PRODUCT OVERLAYS

ACK ALERT	CELL TRENDS	VR/SHEAR DISPLAY	CURRENT CROSS SECTION CR	ANNOT'S AN
HAIL HI	MESO M	TVS TV	STORM TRACK ST	ATTRIBUTE AT
ALERT AREA 1 A1	ALERT AREA 2 A2	SWP SW		COMBINED SHEAR CONTOUR SC
OVERLAYS OFF/ON	OVERLAYS ERASE	MAP OVERLAY DELETE	STOP BLINK	PAGE ATTRIBUTE

PARAMETERS (bottom left)

ELEVATION UP	LOW PRIORITY	DISPLAY PRODUCT
ELEVATION DOWN	REQUEST MAPS	
LOWEST ELEVATION	BLANK TIME DATE	SEND RPG REQ
DED ASSOC RPG	.13 NM	8 LEVEL
DIAL-UP ASSOC RPG	.27 NM	16 LEVEL
RPG 1	.54 NM	HIGH ALT
RPG 2	1.1 NM	MID ALT
RPG 3	2.2 NM	LOW ALT

PRODUCTS / BACKGROUND MAPS (bottom grid)

BASE REF R	COMP REF CR	COMP REF CONTOUR CRC	ECHO TOPS COUNTOUR ETC	REF CROSS SECTION RCS	ACK PRODUCT	DISPLAY QUEUED PRODUCT	PRODUCT OFF/ON	MAPS OFF/ON	MAPS ERASE	MAPS FOREGD/ BACKGD	CANCEL HELP
BASE VEL V	STM REL VEL REGION SRR	STM REL VEL MAP SRM	ECHO TOPS ET	VEL CROSS SECTION VCS	PRODUCT BACK	PRODUCT FORWARD	TRANSFER SCREEN PRODUCT	STATE LAT/LON ST	COUNTY CO	HIGHWAY HY	RADAR SITES RS
BASE SPECTRUM WIDTH SW	COMBINED SHEAR CS	COMBINED SHEAR CONTOUR CSC	COMBINED MOMENT CM	SPECTRUM WIDTH CROSS SECTION SCS	NEXRAD UNIT STATUS	CLEAR QUEUE	REDISPLAY LAST PRODUCT	RIVER RV	RIVER BASIN RB	RDA	RANGE RING
ONE HOUR PRECIP OHP	THREE HOUR PRECIP THP	STORM TOTAL PRECIP STP	USER SELECTABLE PRECIP USP	STORM TRACK STI	TORNADO VORTEX SIGNATURE TVS	RADAR CODED MESSAGE RCM	ALL SWA PRODUCTS	WARNING AREA WA	MIL OPN AREA MO	POLAR GRID	LFM GRID LF
MESO M	SEVERE WEATHER PROBABILITY SWP	WEAK ECHO REGION WER	VERTICALLY INTEGRATED LIQUID VIL	VELOCITY AZIMUTH DISPLAY VAD	HAIL HI	SWA REF SWR	SWA VEL/SRR SWV/SWR	RSTRCTD AREA RA	PRHBTD AREA PA	AIRWAY HIGH AH	CITY CI
LAYER COMP REF MAX LRM	LAYER COMP TURB MAX LTM	LAYER COMP REF AVG LRA	LAYER COMP TURB AVG LTA	VAD WIND PROFILE VWP		SWA SPECTRUM WIDTH SWW	SWA SHEAR SWS	NAVAID NA	AIRPORT AP	AIRWAY LOW AL	COUNTY NAMES CN

PARAMETERS | PRODUCTS | BACKGROUND MAPS

1

2

- To prevent erroneously high shear values the diameter must be greater than one beamwidth. Selecting two points that are less than one beamwidth apart will cause the software to change the diameter to one beamwidth. This usually occurs when working with a storm at a long distance from the RDA.

3.   Select the **VR/Shear Display** in the Product Overlays (orange) section of the Graphics Tablet.

- A line is drawn on the screen between the two points. This line remains displayed until the screen is cleared, the OVERLAYS ERASE function is selected, or the product is re-centered. The line is not saved with the product.

4.   Note the calculated values in the feedback line located in the lower right-hand corner of the display.

- Feedback is immediate with a message displaying an estimate of the rotational velocity (VR), range from the radar (RAN), Shear (S), and Diameter (DI).

- The following are the units and abbreviations for each item displayed in the feedback message:

Rotational velocity	VR	knots
Range from radar	RAN	nautical miles
Shear	S	per second
Diameter	DI	nautical miles

- Rotational velocities are calculated using the mid-range velocity values of the color level selected. Therefore, the calculation for base velocity depends on the data level increments selected at the Unit Control Position (UCP).

- If the maximum displayable value (inbound or outbound) is selected, mid-range is determined by adding (or subtracting) 5 knots to that value. When the maximum value is selected the feedback message displays a greater than sign (>) prefixed to the rotational velocity and shear values.

- The range from the radar displayed is based on the center point between the two selected points.

- The diameter displayed is the distance between the two selected points and cannot be greater than 27 nm.

GRAPHIC TABLET

KEYBOARD | **SYMBOLS** | **USER FUNCTIONS**

EDIT COMMANDS

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EDIT MAP	HIGH DETAIL	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	+ =	BACK SPACE	51 19	52 20	53 21	54 22	55 23	56 24	21	22	23	24	25
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CANCEL EDIT	EXIT EDIT & SAVE	Z	X	C	V	B	N	M	< ,	> .	? /	SPACE	LOWER SHIFT	33 1	34 2	35 3	36 4	37 5	38 6	6	7	8	9	10

PARAMETERS (left column):

- AZRAN SELECT
- CROSS SECTION SELECT
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- TIME
- DATE
- REPEAT COUNT
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- SLICE/ DURATION
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- CENTER RANGE
- STORM DIRECTION
- STORM SPEED
- CONTOUR INTERVAL
- ALL/ONE SWA
- MATCH PARA-METERS
- DEFAULT PARA-METERS

DISPLAY FUNCTIONS / PRODUCT OVERLAYS (right column):

UF1	2	3	4	5
CANCEL UF	SPEED DOWN	SPEED UP	FRAME BACK	FRAME FORWARD
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AUTO RES/HLT	QUAD 1	QUAD 2	RECENTER MAG 1X	RECENTER MAG 2X
FULL SCREEN	QUAD 3	QUAD 4	RECENTER MAG 4X	RECENTER MAG 8X
CLEAR SCREEN/ QUAD	FILTER	COMBINE DOWN	COMBINE UP	CURSOR HOME DEFINE
BLINK COLOR LEVEL	RESTORE DISPLAYED PRODUCT	GRAY/COLOR SCALE	CURSOR AUTO/ MANUAL	CURSOR LINK/UNLINK
ALL QUADRANTS	HARD COPY	PRESET CENTER	CURSOR HOME	AZRAN R/ LAT LON/ AZRAN H
ACK ALERT	CELL TRENDS	VR/SHEAR DISPLAY	CURRENT CROSS SECTION CR	ANNOT'S AN
HAIL HI	MESO M	TVS TV	STORM TRACK ST	ATTRIBUTE AT
ALERT AREA 1 A1	ALERT AREA 2 A2	SWP SW		COMBINED SHEAR CONTOUR SC
OVERLAYS OFF/ON	OVERLAYS ERASE	MAP OVERLAY DELETE	STOP BLINK	PAGE ATTRIBUTE

3 — (pointing to ACK ALERT)

PARAMETERS / PRODUCTS / BACKGROUND MAPS (bottom):

ELEVATION UP	LOW PRIORITY	DISPLAY PRODUCT	BASE REF R	COMP REF CR	COMP REF CONTOUR CRC	ECHO TOPS COUNTOUR ETC	REF CROSS SECTION RCS	ACK PRODUCT	DISPLAY QUEUED PRODUCT	PRODUCT OFF/ON	MAPS OFF/ON	MAPS ERASE	MAPS FOREGD/ BACKGD	CANCEL HELP
ELEVATION DOWN	REQUEST MAPS	SEND RPG REQ	BASE VEL V	STM REL VEL REGION SRR	STM REL VEL MAP SRM	ECHO TOPS ET	VEL CROSS SECTION VCS	PRODUCT BACK	PRODUCT FORWARD	TRANSFER SCREEN PRODUCT	STATE LAT/LON ST	COUNTY CO	HIGHWAY HY	RADAR SITES RS
LOWEST ELEVATION	BLANK TIME DATE		BASE SPECTRUM WIDTH SW	COMBINED SHEAR CS	COMBINED SHEAR CONTOUR CSC	COMBINED MOMENT CM	SPECTRUM WIDTH CROSS SECTION SCS	NEXRAD UNIT STATUS	CLEAR QUEUE	REDISPLAY LAST PRODUCT	RIVER RV	RIVER BASIN RB	RDA	RANGE RING
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RPG 2	1.1 NM	MID ALT	LAYER COMP REF MAX LRM	LAYER COMP TURB MAX LTM	LAYER COMP REF AVG LRA	LAYER COMP TURB AVG LTA	VAD WIND PROFILE VWP		SWA SPECTRUM WIDTH SWW	SWA SHEAR SWS	NAVAID NA	AIRPORT AP	AIRWAY LOW AL	COUNTY NAMES CN
RPG 3	2.2 NM	LOW ALT												

PARAMETERS | PRODUCTS | BACKGROUND MAPS

ADDITIONAL INFORMATION

When using the base velocity products, remember that the resolution (0.13, 0.27 or 0.54 nm) could yield **different** VR/SHEAR values for the same two points. This occurs because the velocity task uses the first 0.13 nm range gate and this is calculated differently for each resolution.

The VR/SHEAR function **can** be used when running a Base Velocity, SRM, or SRR time lapse. The points selected for the VR/SHEAR calculations must be defined on each product before Time Lapse mode is initiated, and is only available for high-resolution Time Lapses (i.e., slower than or equal to 1.0 frame/sec).

The VR/SHEAR function "remembers" the last two points selected. The operator can utilize the previous point selection for subsequent VR/SHEAR selections. These geographical positions can be used for both graphic screens and in both full and quarter screen modes.

The following are feedback messages and their meanings for errors that may be generated when this function is selected.

VR/SHEAR MUST USE BASE VEL, SRM, SRR - The product on the screen at the time the VR/Shear Display function was selected is not a 16 data-level base velocity, storm relative velocity map or storm relative velocity region.

VR/SHEAR MUST USE LINE LENGTH <27 NM - The two points selected to define the velocity couplet are too far apart. The points must be within 27 nautical miles of each other.

VR/SHEAR CANNOT USE RF DATA - One or both of the points selected to define the velocity couplet are in a range folded area. Re-select the points ensuring they lie in a valid velocity data region.

VR/SHEAR CANNOT USE ND DATA - One or both of the points selected to define the velocity couplet are in a no data area. Re-select the points ensuring they lie in a valid velocity data region.

VR/SHEAR DIAMETER TOO SMALL - The two points selected have the same geographic coordinates. Select the points again, making sure they are spaced apart from one another.

INVALID FOR LOW RES TIME LAPSE - The product on the screen is a low resolution time lapse frame. The Vr/Shear function cannot use a low resolution time lapse frame as this resolution yields inaccurate results.

INVALID FOR TIME LAPSE PRODUCT - The product on the screen is an inactive time lapse frame. The Vr/Shear function cannot be used on a time lapse frame that has been left on the screen after the time lapse mode has ended. Note that it can be used on an active high resolution time lapse frame. Always halt the time lapse before attempting to select a velocity couplet.

END